U.S. Serial No. 10/678,547
Reply to Office Action of: January 25, 2008
Family Number: P2002J111 US2

RECEIVED
CENTRAL FAX CENTER
JUL 11 2008

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A functional fluid having improved viscosity and volatility control under conditions of high thermal stress comprising:

a) a base stock or base oil, said base stock or base oil having the properties of:

(a) a viscosity index (VI) of greater than ~~135~~ 140;

(b) a pour point of about ~~-10~~ 20C or lower;

(c) a ratio of measured-to-theoretical low-temperature viscosity equal to about 1.2 or less, at a temperature of about -30C or lower, where the measured viscosity is cold-crank simulator viscosity and where theoretical viscosity is calculated at the same temperature using the Walther-MacCoull equation wherein said base stock or base oil is not a Group IV base stock or base oil;

(d) a Noack volatility of less than 15 weight percent; and

b) ~~at least one additive~~ an additive package having at least one antioxidant, at least one foam inhibitor and at least one anti corrosion additive.

2. (Currently amended) A functional fluid having improved viscosity and volatility control under conditions of high thermal stress comprising:

a) a base stock or base oil, said base stock or base oil having the properties of:

(i) a viscosity index (VI) of ~~135~~ 140 or greater;

(ii) a pour point of about ~~-10~~ 20 C or lower;

(iii) a ratio of measured-to-theoretical low-temperature viscosity equal to about 1.2 or less, at a temperature of about -30C or lower, where the measured viscosity is cold-crank simulator viscosity and where theoretical viscosity is calculated at the same temperature using the Walther-MacCoull equation;

(iv) a percent Noack volatility no greater than that calculated by the formula

$$-6.882\text{Ln}(\text{CCS@-35C}) + 67.647,$$

where CCS@-35C is the base oil CCS viscosity in centipoise, tested at -35C, and that value as used in the equation is less than 5500 cP and wherein said base stock or base oil is not a Group IV base stock or base oil;

(v) a Noack volatility of less than 15 weight percent; and

b) ~~at least one additive~~ an additive package having at least one antioxidant, at least one foam inhibitor and at least one anti corrosion additive.

3. (Currently amended) A lubricating oil having improved viscosity and volatility control under conditions of high thermal stress comprising:

a) at least one base stock or base oil wherein said base stock or base oil has a VI of at least ~~135~~ 140 and pour point less than -20°C produced by a process which comprises:

(i) hydrotreating a feedstock having a wax content of at least about 60 wt.%, based on feedstock, with a hydrotreating catalyst under effective hydrotreating conditions such that less than 5 wt.% of the feedstock is converted to 650F (343C) minus products to produce a hydrotreated feedstock whose VI increase is less than 4 greater than the VI of the feedstock;

(ii) stripping the hydrotreated feedstock to separate gaseous from liquid product;

(iii) hydrodewaxing the liquid product with a dewaxing catalyst which is at least one of ZSM-48, ZSM-57, ZSM-23, ZSM-22, ZSM-35, ferrierite, ECR-42, ITQ-13, MCM-71, MCM-68, beta, fluorided alumina, silica-alumina or fluorided silica alumina under catalytically effective hydrodewaxing conditions wherein the dewaxing catalyst contains at least one Group 9 or Group 10 noble metal; and

b) ~~at least one additive~~ an additive package having at least one antioxidant, at least one foam inhibitor and at least one anti corrosion additive.

4. (Currently amended) A functional fluid having improved viscosity and volatility control under conditions of high thermal stress comprising:

a) at least one base stock or base oil wherein said base stock has a VI of at least ~~135~~ 140, a pour point of about ~~-10~~ -20°C or lower, and a Noack volatility of less than 15 weight percent produced by a process which comprises:

(i) hydrotreating a lubricating oil feedstock having a wax content of at least about 50 wt.%, based on feedstock, with a hydrotreating catalyst under effective hydrotreating conditions such that less than 5 wt.% of the feedstock is converted to 650F (343C) minus products to produce a hydrotreated feedstock to produce a hydrotreated feedstock whose VI increase is less than 4 greater than the VI of the feedstock;

(ii) stripping the hydrotreated feedstock to separate gaseous from liquid product;

(iii) hydrodewaxing the liquid product with a dewaxing catalyst which is at least one of ZSM-22, ZSM-23, ZSM-35, ferrierite, ZSM-48, ZSM-57, ECR-42, ITQ-13, MCM-68, MCM-71, beta, fluorided alumina, silica-alumina or fluorided silica-alumina under catalytically effective hydrodewaxing conditions wherein the dewaxing catalyst contains at least one Group 9 or 10 noble metal; (iv) hydrofinishing the product from step (3) with a mesoporous hydrofinishing catalyst from the M41S family under hydrofinishing conditions; and

b) ~~at least one additive~~ an additive package having at least one antioxidant, at least one foam inhibitor and at least one anti corrosion additive.

5. (Currently amended) A functional fluid having improved viscosity and volatility control under conditions of high thermal stress comprising:

a) at least one base stock wherein said base stock has a VI of at least ~~135~~ 140, a pour point of about ~~-10~~ 20°C or lower, and a Noack volatility of less than 15 percent produced by a process which comprises:

(i) hydrotreating a lubricating oil feedstock having a wax content of at least about 60 wt.%, based on feedstock, with a hydrotreating catalyst under effective hydrotreating conditions such that less than 5 wt.% of the feedstock is converted to 650F (343C) minus products to produce a hydrotreated feedstock to produce a hydrotreated feedstock whose VI increase is less than 4 greater than the VI of the feedstock;

(ii) stripping the hydrotreated feedstock to separate gaseous from liquid product;

(iii) hydrodewaxing the liquid product with a dewaxing catalyst which is ZSM-48 under catalytically effective hydrodewaxing conditions wherein the dewaxing catalyst contains at least one Group 9 or 10 noble metal;

(iv) Optionally, hydrofinishing the product from step (3) with MCM-41 under hydrofinishing conditions; and

b) ~~at least one additive~~ an additive package having at least one antioxidant, at least one foam inhibitor and at least one anti corrosion additive.

6. (Original) The functional fluid as in any one of claims 3, 4, or 5, wherein said feedstock is a synthetic gas to liquid feedstock.

7. (Original) The functional fluid as in any one of claims 3, 4, or 5, wherein said feedstock is made by a Fischer-Tropsch process.

8. (Currently amended) A functional fluid of claims 1, 2, 3, 4 or 5 comprising at least one additional performance enhancing additive.

9. (Original) A functional fluid of claims 1, 2, 3, 4 or 5 comprising at least one performance enhancing additive where said performance enhancing additive is not a viscosity index improver.

10. (Previously presented) A method of improving circulating oil comprising using the functional fluid of claims 1, 2, 3, 4 or 5 as a circulating oil.

11. (Previously presented) A method of improving compressor oil comprising using the functional fluid of claims 1, 2, 3, 4 or 5 as a compressor oil.

12. (Previously presented) A method of improving an internal lubricant for sintered metal materials comprising using the functional fluid of claims 1, 2, 3, 4 or 5 as an internal lubricant for sintered metal materials.

13. (Currently amended) A method of making a functional fluid having improved viscosity and volatility control under conditions of high thermal stress comprising incorporating a base stock or base oil having the properties of

(a) a viscosity index (VI) of ~~135~~ 140 or greater,

(b) a pour point of ~~-10~~ 20C or lower,

(c) a ratio of measured-to-theoretical low-temperature viscosity equal to 1.2 or less, at a temperature of -30C or lower, where the measured viscosity is cold-crank simulator viscosity and where theoretical viscosity is calculated at the same temperature using the Walther-MacCoull equation~~,~~ and

(d) a Noack volatility of less than 15 weight percent

wherein said base stock or base oil is not a Group IV base stock or base oil~~,~~ and an additive package having at least one antioxidant, at least one foam inhibitor and at least one anti corrosion additive.

14. (Currently amended) A method of making a functional fluid having improved viscosity and volatility control under conditions of high thermal stress comprising incorporating a base stock or base oil having the properties of

(a) a viscosity index (VI) of ~~135~~ 140 or greater,

(b) a pour point of ~~-10~~ 20C or lower,

(c) a ratio of measured-to-theoretical low-temperature viscosity equal to 1.2 or less, at a temperature of -30C or lower, where the measured viscosity is cold-crank simulator viscosity and where theoretical viscosity is calculated at the same temperature using the Walther-MacCoull equation, and

(d) a percent Noack volatility no greater than that calculated by the formula

$$-6.882\,\mathrm{Ln}(\mathrm{CCS@-35C}) + 67.647,$$

where CCS@-35C is the base oil CCS viscosity in centipoise, tested at -35C, and that value as used in the equation is less than 5500 cP, and

wherein said base stock or base oil is not a Group IV base stock or base oil.

(c) a Noack volatility of less than 15 weight percent,

and an additive package having at least one antioxidant, at least one foam inhibitor and at least one anti corrosion additive.

15. (Original) A method of reducing the Noack volatility of a functional fluid comprising incorporating said base stock or base oil of any one of the claims 1, 2, 3, 4 or 5.

16. (Canceled)

17. (Currently amended) A functional fluid of any of the claims 1, 2, 3, 4 or 5 wherein the pour point is less than ~~-20~~ 30°C.